MEMORANDUM

[redacted] CLASSIFICATION

Declass. fed Dec 14/70

TO (1) RECORDS
A (2) FOR FILE

YOUR FILE No. Votre dossier

OUR FILE No. 22-12-33 (TRB)

FROM De TRB

DATE September 15, 1969.

FOLD

SUBJECT Sujet PROJECT 'MAGNET'

DRB Agreed to this wpo

Dr. P. M. Millman, National Research Council, has advised me that the documents reporting the results of the Second Story studies in project 'Magnet' be declassified. Those reading this file will see that project 'Magnet' is a part of this file.

2. Since the question of flying saucers is still attracting public attention and since this file covers documents relating to the studies behind project 'Magnet' and, indeed, records much of the discussion in the Department of Transport surrounding project 'Magnet' which is confidential in nature, it is recommended that this file be down classified at least to the confidential level. At no time should it be made available to the public.

action taken Chron Spec file 6/10/69

3. Those wishing to obtain a copy of project 'Magnet' can do so provided they represent an organization, describe the purposes of the organization and set forth the basis of their need for a copy to Dr. Millman of National Research Council. They may see the project 'Magnet' report upon making an appointment at the Meteor Centre, phone 3-9318.

4. A copy of the project 'Magnet' report on this file is the original and should not be destroyed until such time as this subject has "cooled off".

W. J. Wilson

W. J. Wilson

PROJECT MAGNET REPORT

During the past five years there has been accumulating in the files of the United States Air Force, Royal Canadian Air Force, Department of Transport, and various other agencies, an impressive number of reports on sightings of unidentified flying objects popularly known as "Flying Saucers". These files contain reports by creditable people on things which they have seen in the sky, tracked by radar, or photographed. They are reports made in good faith by normal, honest people, and there is little if any reason to doubt their veracity. Many sightings undoubtedly are due to unusual views of common objects or phenomenae, and are quite normal, but there are many sightings which cannot be explained so easily.

Project Magnet was authorized in December, 1950, by Commander O. P. Edwards, then Deputy Minister of Transport for Air Services, for the purpose of making as detailed a study of the saucer phenomenae as could be made within the framework of existing establishments. The Broadcast and Measurements Section of the Telecommunications Division were given the directive to go ahead with this work with whatever assistance could be obtained informally from outside sources such as Defence Research Board and National Research Council.

It is perfectly natural in the human thinking mechanism to try and fit observations into an established pattern. It is only when observations stubbornly refuse to be so fitted that we become disturbed. When this happens we may, and usually do, take one of three courses. First, we may deny completely the validity of the observations; or second, we may pass the whole subject off as something of no consequence; or third, we may accept the discrepancies as real and go to work on them. In the matter of Saucer Sightings all three of these reactions have been strikingly apparent. The first two approaches are obviously negative and from which a definite conclusion can never be reached. It is the third approach, acceptance of the data and subsequent research that is dealt with in this report.

The basic data with which we have to work consist largely of sightings reported as they are observed throughout Canada in a purely random manner. Many of the reports are from the extensive field organization of the Department of Transport whose job it is to watch the sky and whose observers are trained in precisely this sort of observation. Also, there are in operation a number of instrumental arrangements such as the ionospheric observatories from which useful data have been obtained. However, we must not expect too much from these field stations because of the very sporadic nature of the sightings. As the analysis progresses and we know more about what

to look for we may be able to obtain and make much better use of field data. Up to the present we have been prevented from using conventional laboratory methods owing to the complete lack of any sort of specimens with which to experiment, and our prospects of obtaining any in the immediate future are not very good. Consequently, a large part of the analysis in these early stages will have to be based on deductive reasoning, at least until we are able to work out a procedure more in line with conventional experimental methods.

The starting point of the investigation is essentially the interview with an observer. A questionnaire form and an instructional guide for the interrogater were worked out by the Project Second Storey Committee, which is a Committee sponsored by the Defence Research Board to collect, catalogue and correlate data on sightings of unidentified flying objects. This questionnaire and guide are included as Appendix I, and are intended to get the maximum useful information from the observer and present it in a manner in which it can be used to advantage. This form has been used so far as possible in connection with the sightings investigated by the Department of Transport.

A weighting factor is assigned to each sighting according to a system intended to minimize the personal equation. This weighting system is described in Appendix II. The weighting

factor may be considered as the probability that the report contains the truth, the whole truth and nothing but the truth, so far as the observer and interrogater are aware. It has nothing to do with the nature of the object claimed to be seen. It is in a sense analagous to the order of precision with which a measurement may be made, and for the purpose of this analysis this is precisely the manner in which it is used.

Sightings may be grouped according to certain salient features, and the combined weight of all pertinent observations with respect to these features may be determined by applying Peter's formula, which is a standard mathematical technique for determining probable error.

$$r_o = \frac{.8453}{n\sqrt{n-1}} (v_1 + v_2 + v_3 + \ldots . v_n)$$

where r_o is the probable error of the mean, n is the number of observations and v is the probable error of each observation, that is, unity minus the weighting factor. This method has the advantage of being simple and easy to use and enables a number of mediocre observations to be combined effectively into the equivalent of one good one.

The next step is to sort out the observations according to some pattern. The particular pattern is not so important as the fact that it should take account of all contingencies

however improbable they may appear at first sight. In other words, there must be a compartment somewhere in the scheme of things into which each sighting may be placed, comfortably, and with nothing left over. Furthermore, it must be possible to arrive at each appropriate compartment by a sequence of logical reasoning taking account of all the facts presented. If this can be done, then the probability for the real existance of the contents of any compartment will be the single or combined weighting factor pertinent to that single or group of sightings. The charts shown in Appendix III were evolved as a means for sorting out the various sightings and provide the pattern which was used in the analysis of those sightings reported to and analysed by the Department of Transport.

Most sightings fit readily into one of the classifications shown, which are of two general types; those about which we know something and those about which we know very little. When the sightings can be classified as something we know about, we need not concern ourselves too much with them, but when they fit into classifications which we don't understand we are back to our original position of whether to deny the evidence, dismiss it as of no consequence, or to accept it and go to work on it. The process of sorting out observations according to these charts and fitting them into compartments can hardly by considered an

end in itself. Rather, it is a convenience to clarify thinking and direct activity along profitable channels. It shows at once which aspects are of significance and which may be bypassed. Merely placing a sighting under a certain heading does not explain it; it only indicates where we may start looking for an explanation.

Appendix IV contains summaries of the 1952 sightings as investigated by the Department of Transport. Considerably more data exists in the files of other agencies, and more is being collected as the investigations proceed. While it is not intended to make any reference to an analysis of the records of other agencies, it may be said that the Department of Transport sightings are quite representative of the sightings reported throughout the world. The following is a table of the breakdown of the 25 proper sightings reported during 1952.

NATURE OF SIGHTING	NUMBER	WEIGHT
Probably meteor	4	91%
Probably aircraft	1	69%
Probably balloons	1	74%
Probably marker light	1	64%
Bright speck at night, not star or planet	3	75%
Bright speck daylight, not star or planet	1	68%
Luminous ring	1	68%
Shiny cone	1	53%
Circular or elliptical body, shiny day	5	83%

NATURE OF SIGHTING	NUMBER	WEIGHT
Circular or elliptical body luminous night	5	90%
Unidentified lights of various kinds	2	77%
TOTAL NUMBER OF PROPER SIGHTINGS	25	96%

With reference to the above table, of the four cases identified as probably meteors, their weight works out at 91%, which is the probability that the observers actually did see meteors which appeared as they described them. Considering the circular or elliptical bodies together, their weight works out at 91% for the ten sightings, from which we may conclude that SOMETHING answering this description was actually observed. Similarly we may consider each of the other groups of sightings, taking account of the probability that the observations are reliable.

It is not intended to describe here in detail the intricate and tedious processes by which the sightings are evaluated, beyond the fact that the pattern set forth in the charts in Appendix III is followed. The cardinal rule is that a sighting must fit completely under one or more of the chart headings, with nothing left over and without postulating any additions, deletions, or changes in the facts as reported. Should there be no suitable heading, then obviously the charts must be expanded to provide one, in fact this was the evolution of these charts. Where a sighting may be fitted under more than one heading an arbitrary division of the probability of finding it under each applicable heading is assigned. The sum of such

probability figures must of course be unity, and the probability for the real existance under any particular heading is the product of this probability figure and the reliability or weighting factor for the sighting concerned.

It is apparent that the judgement of the people doing the evaluating is bound to enter the picture and may produce substantial numerical differences with reference to sightings listed under certain headings. However, since many headings are automatically eliminated by the nature of the facts available, the discrepancies are confined to the probability figures for the distribution under the remaining headings which are considered eligible, and we end up with definite classifications for the sightings with SOME probability figure for the reality of each group. This has the effect of forcing those who are doing the evaluating to face the reported facts squarely, pay meticulous attention to them, and place each sighting honestly under the only headings where it will fit.

In working through the analysis of the proper sightings listed, we find that the majority of them appear to be of some material body. Of these, seven are classed as probably normal objects, and eleven are classed as strange objects. Of the remainder, four have a substantial probability of being material, strange, objects, with three having a substantial probability of being immaterial, electrical, phenomenae. Of the eleven strange objects the probability definitely favours the alien

vehicle class, with the secret missile included with a much lower probability.

The next step is to follow this line of reasoning as far as possible so as to deduce what we can from the observed data. Vehicles or missiles can be of only two general kinds, terrestrial and extra-terrestrial, and in either case the analysis enquires into the source and technology. If the vehicles originate outside the iron curtain we may assume that the matter is in good hands, but if they originate inside the iron curtain it could be a matter of grave concern to us.

In the matter of technology, the points of interest are; - the energy source; means of support, propulsion and manipulation; structure; and biology. So far as energy is concerned we know about mechanical energy and chemical energy, and a little about energy of fission, and we can appreciate the possibility of direct conversion of mass to energy. Beyond this we have no knowledge, and unless we are prepared to postulate a completely unknown source of energy of which we do not know even the rudiments, we must conclude that the vehicles use one of the four listed energy sources. Unless something we do not understand can be done with gravitation, mechanical energy has little use beyond driving model aircraft. We use chemical energy to quite an extent, but we realize its limitations, so if the energy demands of the vehicles exceed what we consider to be the reason-

able capabilities of chemical fuels, we are forced to the conclusion that such vehicles must get their energy from either fission or mass conversion.

With reference to the means for support, propulsion and manipulation, unless we are prepared to postulate something else quite beyond our knowledge, there are only the two groups of possibilities, namely the known means and the speculative means. Of the known means there is only physical support through the use of buoyancy or airfoils, the reaction of rockets and jets, and centrifugal force, which is what holds the moon in position. Of the speculative means we know only of the possibility of gravity waves, field interaction and radiation pressure. If the observed behaviour of the vehicles is such as to be beyond the limitations which we know apply to the known means of support, then we are forced to the conclusion that one of the speculative means must have been developed to do the job.

From a study of the sighting reports (Appendix IV), it can be deduced that the vehicles have the following significant characteristics. They are a hundred feet or more in diameter; they can travel at speeds of several thousand miles per hour; they can reach altitudes well above those which would support conventional aircraft or balloons; and ample power and force seem to be available for all required manoeuvres. Taking these factors into account, it is difficult to reconcile this performance

with the capabilities of our technology, and unless the technology of some terrestrial nation is much more advanced than is generally known, we are forced to the conclusion that the vehicles are probably extra-terrestrial, in spite of our prejudices to the contrary.

It has been suggested that the sightings might be due to some sort of optical phenomenon which gives the appearance of the objects reported, and this aspect was thoroughly investigated. Charts are shown in Appendix III showing the various optical considerations. Enticing as this theory is, there are some serious objections to its actual application, in the form of some rather definite and quite immutable optical laws. These are the geometrical laws dealing with optics generally and which we have never yet found cause to doubt, plus the wide discrepancies in the order of magnetude of the light values which must be involved in any sightings so far studied. Furthermore, introducing an optical system might explain an image in terms of an object, but the object still requires explaining. A particular effort was made to find an optical explanation for the sightings listed in this report, but in no case could one be worked out. It was not possible to find so much as a partial optical explanation for even one sighting. Consequently, it was felt that optical theories generally should not be taken too seriously until such time as at least one sighting can be satisfactorily explained in such a manner.

It appears then, that we are faced with a substantial probability of the real existance of extra-terrestrial vehicles, regardless of whether or not they fit into our scheme of things. Such vehicles of necessity must use a technology considerably in advance of what we have. It is therefore submitted that the next step in this investigation should be a substantial effort towards the acquisition of as much as possible of this technology, which would without doubt be of great value to us.

W. B. Smith,
Engineer-in-Charge,
Project Magnet.

PROJECT SECOND STOREY

Part I - Information for guidance in reporting on unknown flying objects.

In collecting data on unknown flying objects, accuracy of observation and record is of prime importance. The observer should report carefully and precisely what he sees and hears with a minimum of private personal interpretation. Accurate numerical data to the best of the observer's ability are most desirable. Confirmation of the observation by others is also desirable, particularly if other observers are located some distance away so that they may have a slightly different view of the object.

The sighting report is for the purpose of obtaining specific information regarding a particular sighting. Most of the questions are straightforward and call for an obvious answer. Some questions, however, may require a certain amount of explanation so that the required information may be forthcoming. It should be noted that the information obtained will not be made public.

The following headings refer to numbered questions on the Project Second Storey Sighting Report Form.

A. (3) Occupation and Previous Relevant Experience
Note: State if the observer has had any previous experience, for example, as an observer in the Air Force or as an amateur astronomer, or as an employee at a Government Weather Station.

B. (7) Date and Local Time
The exact date and time, whether Local, Standard, or Daylight Saving Time of a sighting should be specified. Where possible the accuracy of the time piece should be determined.

B. (8) Position of observer as accurately as possible.
The exact position of the observer during the sighting should be noted as accurately as possible, with particular reference to nearby objects such as buildings, trees, etc. Where possible the exact latitude and longitude of the point of observation should be given. If this is not known the point should be indicated on a convenient map.

B. (9) General description of sighting
In answer to this question it is hoped to obtain a general description of what the observer actually saw and the circumstances under which he observed it.

B. (12) Position in which first seen
The position of the object seen may be described conveniently by bearing and elevation. By bearing it is meant the direction from the observer towards the object in terms of the cardinal points of the compass, or if possible, more accurately in the terms of degrees East or West of true North. It is useful to give the direction from the observer to the object in relation to the roads or concession lines. The level horizon is taken as zero degrees, the point directly overhead as 90 degrees.

B. (13) Position in which last seen
Note: See remarks under B. (12). This description should be as full and complete as possible. If there was any change in shape during the course of the observation, such change in shape should be indicated. The average man's left hand, with arm fully stretched out gives the following measurements.

(a)	Between the first and second knuckles	3°
(b)	Across the knuckles	8°
(c)	With fingers extended, from point of index finger to point of little finger	12°
(d)	With fingers extended from tip of thumb to tip of little finger	19°

Note: See Fig. (1) at foot of page 2.

Because of the distance from the observer, the three dimensional form cannot generally be determined. However, the object will have an apparent shape in two dimensions, circular, oval, rectangular, triangular, etc. The two dimensional shape of the outline should be reported, not as an assumed three dimensional form.

B. (16) Detailed description of apparent brightness
It is realized that a description of apparent brightness is extremely difficult. However, if the object is seen at night or after sundown it might be compared to the brightness of the moon, planets or stars.

B. (17) Detailed description of colour
In describing colour the simplest terms possible should be used such as red, green, white, etc.

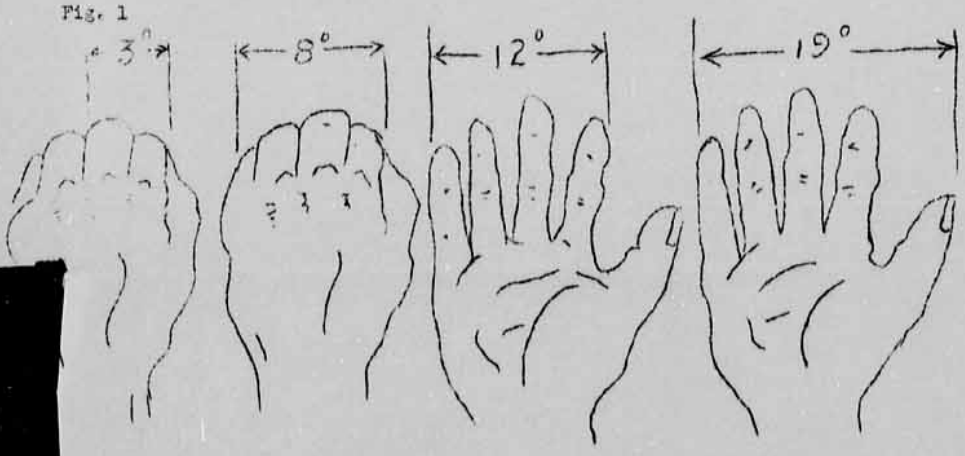
B. (18) Apparent size (angle subtended)
The same technique for determining the apparent size of the object could be used as under B. (12) for determining its elevation. For information purposes the full moon subtends an angle of approximately $\frac{1}{2}$ degree which is the angle subtended by a $\frac{1}{4}$ inch object held at arm's length. Since it is quite impossible to form even a rudimentary estimate of the size in feet or inches unless the distance is known, the size should be stipulated only in terms of the angle subtended by the object as seen by the observer.

B. (24) Other contributory evidence (photographic, electronic, etc. An effort should be made to uncover any evidence of a photographic, electronic, magnetic or radioactive nature which might have some association with the sighting, No unusual happenings at the time or place of sighting should be overlooked.

B. (25) Any other details
Under this heading a sketch of the path would be extremely helpful. This need only be a line drawing showing the position and orientation of the object in relation to visible land marks. If the observer should happen to be close enough to the object to form an opinion as to its shape and construction, a sketch to an approximate scale would be extremely valuable.

C. (27) Date and place of interrogation
An interview which takes place at the point from which the observer saw the object is the most valuable, since position bearings, elevation, etc., may be established more accurately in this way. It should be specified if the interview was conducted at the observation point.

Fig. 1



PROJECT SECOND STOREY

Part II - Descriptions of Normal Phenomena which might cause reports of unidentified aerial objects.

Balloons

Ceiling Balloons and unlighted Pilot Balloons are used in daytime. These balloons are about two feet in diameter. Red or White colours are employed.

At night, pilot balloons carry either a paper lantern lighted by a candle or a small battery-powered electric light. These are not likely to be visible to any great height by the naked eye, but a balloon with a slow leak might carry a light across the sky for a considerable distance at a relatively low level.

Radiosonde balloons are about five or six feet in diameter, coloured white, and carry a small box at the end of a cord about twenty feet below the balloon. Sometimes a radar reflector is also tied to the balloon; this is a reflector of many faces and it is possible that some unusual reflections of light may occur from this attachment. Radiosonde balloons normally ascend to about 60,000 feet.

Skyhook Balloons are used occasionally for special high-altitude observations which takes them up to 100,000 feet. These balloons are about 75 feet in diameter and an instrument box tied beneath. Because of their size, there is a good possibility that such balloons are the basis of some reports of unusual aerial objects.

In the daytime with blue skies, good visibility and bright sunshine, balloons may be seen at considerable heights once they are located by the eye. The balloons stand out against the blue of the sky as sharppin points of light.

Aircraft

Aircraft seen in this country should conform to the well known silhouettes but, in view of developments in neighbouring countries, triangular (delta wing) and tailless types, possibly flying at great heights, may be seen. Also due to distances and aircraft attitudes in flight, the true plan forms may not be observed. A change in shape during the observation may well indicate the existence of these circumstances.

Effects of Screens, Glass, Etc.

Common objects when viewed through screens may be distorted out of all recognizable shapes; often single objects may appear as several. As commercial sheet glass (window panes) may contain defects causing similar optical phenomena, observers should be wary of such conditions.

Nacreous or Mother of Pearl Clouds

These rare clouds are most likely to be seen just before sunrise or just after sunset when illuminated by sunshine from below the horizon. They may also appear in daytime. The clouds occur at heights of 15 to 20 miles and have iridescent colours which resemble the colours seen in mother of pearl. It is possible that a small detached mother of pearl cloud might give the appearance of a hovering object high in the sky.

Noctilucent Clouds

Noctilucent or night-luminous clouds are seen only at night made visible by reflected light from the sun when the sun is about 10° to 18° below the horizon and visibility conditions are very good. They usually appear about an hour after sunset, low on the horizon. Their colour may be white or they may be a shade of colour such as bluish-white, golden, or reddish-orange, but they do not display the brilliant iridescent colours that are characteristics of mother of pearl clouds. Noctilucent clouds occur about 50 miles high in the atmosphere, as determined by simultaneous photography from different points on the earth's surface. Their speeds have been calculated to be as high as 400 miles per hour, but because of their great height they appear to move slowly.

APPENDIX II

WEIGHTING FACTORS FOR ANALYSIS OF SIGHTING REPORTS

In the analysis of sighting reports it is fairly obvious that different reports will have widely different values from the viewpoint of reliability, confirmation and lucidity. A formula has been devised giving approximately the same significance to each of these factors and derived from numerical values assigned to the answers given to the various questions on the Project Second Storey sighting report form.

The formula is as follows: - weight equals the cube root of the product of the reliability, confirmation and lucidity factors each expressed as decimals.

To facilitate obtaining numerical values for each of the factors, a scheme has been worked out for assigning points to each question such that for each factor the maximum possible score would be 100%. An equalizing scheme has been included so as to reduce to a minimum the opinion or judgment of the person assigning the score. It is expected that in this manner reasonably consistent scores will be obtained from which the various factors may be determined and a fair overall weighting factor calculated.

It should be noted that the cube root feature of the weighting factor minimizes the effect of any one particular aspect of the report and allows better assessment on the overall report.

Clouds Reflections

Reflections of light from cloud banks are also a possible source of reports of illuminated objects in the sky at night. The source of light may be any kind of a searchlight, such as ceiling projectors, defence units, aircraft landing-lights, etc. Usually a beam of the light is visible from the source up to illuminated spot, so this condition is not likely to deceive a careful observer.

Optical Phenomena

Rainbows are common optical phenomena caused by a refraction and reflection of light from the sun by water drops in the atmosphere. A small portion only of a rainbow may be seen at times which might give the appearance of a small object in the sky. However, because rainbows are fairly common occurence, they are unlikely to deceive anyone.

Optical phenomena caused by reflections of light from ice crystals suspended in the atmosphere may result in the appearance of unusual lighting effects in the sky. The halo around the sun or moon is the most common of this class of phenomena. The halo is usually seen as a ring of 22° radius around the sun or moon, but under some conditions it is possible for only part of the ring to be formed. Sundogs or mock-suns may appear at an angle of 22° either to the right or left of the sun - these appear as bright spots of light in the sky. Mock-suns sometimes are seen at angles of 46° or 90° from the sun. The possibility of halo phenomena should always be considered when any bright spot is seen in the sky - such spots will remain relatively fixed in position. Halo phenomena are most commonly caused by the sun because of the large amount of light available from this source, but the complete halo ring is frequently seen around the moon at night and it is possible that under unusual conditions other halo phenomena may also be seen at night.

Met eors

A meteor, or shooting star, always pursues a nearly straight (or great circle) path across the sky. Faint meteors last about half a second, brighter ones rarely more than two or three seconds. Bright meteors may burst and shower sparks or may leave a faint luminescence in their wake that is sometime visible for several minutes. Bright meteors may appear of almost any colour and in exceptional cases produce detonations and rumbling sounds. When coming head on a meteor seems to have almost no motion across the sky but when moving perpendicular to the line of sight its apparent velocity if rapid.

Stars and Planets

Stars and planets can generally be recognized without difficulty but on certain occasions appear with unusual brilliance thus exciting comment. In any case they never move rapidly but have a slow general motion from the east to the west part of the sky, except for the stars in the north where the motion is counter-clockwise about the pole star. Venus at its greatest brilliance can appear in the sunlit-sky as a faint white dot visible to the naked eye. It either precedes or follows the sun on these occasions.

The Aurora

The aurora, or northern light, produces various luminous forms of numerous pastel shades. In most parts of Canada northern lights may appear in any part of the sky though they are seen most frequently in the north. Although sharp rays may appear as part of the display most of the illumination is of a very diffuse type and is subject to rapid motion and change of intensity reminding one of the great flickering flames or searchlight playing over clouds. Sometimes small, restricted auroral glows remain almost stationary in one place for some period of time. In general outlines are diffuse

Sighting Report

(A Separate form is to be used for each observer).

A. Details of observer.

1. Name of observer:

Surname:.....Initials.....

2. Address of observer:

.....
Number Street City

.....
Province

3. Occupation and previous relevant experience:

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.....

4. Age Group:.....

5. Has observer seen "flying objects" before, and if so, briefly, when, where, and circumstances:

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6. Was observer wearing glasses?

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B. Details of Observation

7. Date and local time:

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8. Position of observer as accurately as possible:

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.....

9. General description of sighting:

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11. Length of time observed.....

12. Position in which first seen:

Bearing:.....

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Elevation:.....

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13. Position in which last seen:

Bearing.....

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Elevation.....

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14. General description of any changes in the direction of motion.

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15. Detailed description of apparent shape:

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16. Detailed description of apparent brightness:

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17. Detailed description of colour.

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18. Apparent size (e.g. angle subtended)

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19. Description of exhaust or vapour trails, if any.

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20. Description of noise, if any:

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21. Weather conditions:

(a) Clouds.....

(b) Visibility.....

(c) Precipitation.....

(d) General remarks:.....

.....

22. Was the object flying above, below or in and out of cloud?

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23. Did anyone else see the object? If so, names and addresses:

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24. Is there other contributory evidence:
(Photographic, or electronic, etc.)

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25. Any other details: (including sketch if possible)

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C. Details of Interrogator

26. Interrogator:

Surname:.....

Initials.....

Position held:.....

27. Date and place of interrogation:

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28. Interrogator's opinion of the reliability of the observer.

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(Signature of Interrogator)

In the following paragraphs reference is to the Project Second Storey sighting report form, Appendix I.

RELIABILITY:

Under Reliability the following maximum points have been assigned.

Question 3 - 15 points	Question 6 - 5 points
" 4 - 5 "	" 27 - 20 "
" 5 - 5 "	" 28 - 50 "

In assigning points for Question 3 a trained observer in sky work should rate between 10 and 15, a trained observer in other fields should rate between 5 and 10 and an untrained observer should rate between 0 and 5. With reference to age, Question 4, if the observer is over 21 but under 65 years a maximum of 5 points; 18 to 21, 4 points; 15 to 18, 3 points; 12 to 15, 2 points; 9 to 12, 1 point; less than 9, 0 points. Over 65 but under 70 years, 4 points, 70 to 75, 3 points; 75 to 80, 2 points, 80 to 85, 1 point; over 85, 0 points.

Question number 5, no flying objects seen previously of if so such objects were completely recognized, 5 points; unidentified objects seen occasionally 2-4 points; unidentified objects frequently seen 0-2.

Question number 6, no glasses, 5 points; glasses normally worn and worn at the time of sighting, 4 points, bi-focal glasses normally worn and used at the time of sighting,

3 points; two kinds of glasses normally worn with wrong kind on at time of sighting, 2 points; glasses normally worn but not used at time of sighting, 0 to 1 point.

CONFIRMATION:

In the confirmation factor answers to Questions 21, 23 and 24 are essentially confirmatory. A fixed score of 50% is accorded because of the fact that the sighting was reported by this one observer. If the weather conditions covered by Question 21 are confirmed completely or partially by official weather reports a score of up to 10 points may be allowed. If the sighting was also witnessed by other people a score of up to 30 points may be allowed, distributed as follows: 2 other witnesses unknown to each other and geographically separated, 25 to 30 points; one other witness as above 20 to 25 points; more than one witness at the same place and time, 15 to 20 points; witnesses eleswhere with some factors, such as direction, time, etc. in doubt, 10 to 15 points; other witnesses of doubtful confirmation 5 to 10 points; vague or no confirmation, 0 to 5 points. Up to 10 points should be allowed for confirmation by other means as in Question 24.

LUCIDITY:

The lucidity factor should be considered as completely independent of reliability or confirmation and should deal only with the value of the information given, assuming that it is completely reliable and entirely confirmed. In assigning scores

to the various questions extreme care should be used to avoid influencing the score by any prejudice regarding reliability or confirmation as these two factors are taken care of adequately in the overall formula for obtaining the weighting factor.

Question 8 - if the position of the observer can be plotted as a pencil point on a map, scale one mile to one inch, 5 points should be allowed; if the position can be established within one city block or a square 500' on the side, 4 points should be allowed; within a square 2000' on the side, 3 points should be allowed; within one square mile, 2 points should be allowed; within city or township limits, one point should be allowed; general area only, zero points.

If a specific description of the sighting is given 8 to 10 points may be allowed. If a good analogy is given 6 to 8 points may be allowed. A poor analogy given 4 to 6 points may be allowed. A vague description 2 to 4 points may be allowed. Where the number of objects seen is specifically stated, 2 points may be given to be reduced towards zero if there is any doubt.

In Question 11, the length of time during which the sighting was observed and the degree of accuracy which appears to be indicated should be used to determine a score from 5 down to zero.

In Questions 12 and 13, if the bearing and elevation can be established within plus or minus 5°, 5 points each should be allowed for bearing and elevation. If the determination is

between 5° and 10°, 4 points should be allowed; if between 10° and 20°, 3 points should be allowed; if between 20° and 45°, 2 points should be allowed; if general directions only are given, one point, if no or unsatisfactory information is given, zero points. If a statement is given regarding the change in course, 2 points should be accorded; if the statement is vague only 1 point; or if information is not given, zero.

Under Question 15, if a definite shape was apparent and described specifically, 5 points; if the shape was poorly described, 4 points; if the shape was indefinite, 3 points; if it was a blur or spot of light, 2 points; any vague description, 1 point; no information, zero.

With respect to colour, if the description is such that the colour can be identified on a spectrum chart 5 points may be allowed; if it is compared with some common light source 4 points may be allowed; if it is referred to an equivalent temperature three points may be allowed; if a general description only is given 2 points; an indefinite statement 1 point; no information, zero.

With respect to size, if the angle subtended was determined at the time of the sighting and can be specified within 10% 8 to 10 points may be allowed; if the angle was determined after the sighting and it is estimated to be within 10%, 6 to 8 points; if the angle is referred to the angle

subtended by the sun or full moon, 4 to 6 points; if the angle is referred to the angle subtended by a familiar object at a stated distance, 2 to 4 points; vague description only, zero to 2.

If exhaust or vapour trails are indicated or statement as to their absence 2 points may be allowed; if there is any degree of doubt the score should be reduced towards zero.

Answers concerning noise should be given 3 points if they are specific and reduced towards zero if they are not specific.

Under weather conditions the total possible score of 5 should be scaled in proportion to the number of statements confirmed by official weather report.

Question 22, if a specific statement was made concerning the position of the object with reference to clouds 2 points may be allowed; scaled down towards zero if there is any doubt.

Under Question 25, if details are consistently described, 20 to 25 points; if details are loosely described 15 to 20 points, if they are vaguely described, 10 to 15 points; if details are absent and general description only is given, 5 to 10 points, and if a vague general description only is given, zero to 5 points.

Under Question 27, if the interview took place at the site of the sighting at a similar time and day and within a week, 20 points may be accorded; if the interview was at the site

at a similar time of day and later than a week, 15 to 20 points; if at the site at a different time of day, 15 points, if not at the site but within a week, 10 to 15 points; not at the site and/or later than a week, zero to 10 points.

Under Question 28, is the interrogator's opinion of the reliability of the observer. Answers to questions 3, 4, 5, 6, and 27 should go a long way towards establishing the reliability of the observer and the score obtained from the answers to these five questions should form the guide for the score to be assigned to Question 28. If, however, the interrogator's opinion appears to indicate a substantial deviation from the total so obtained the score for Question 28 should be adjusted accordingly. The maximum score possible is 50 and under normal circumstances should be about the same as the total score for questions 3, 4, 5, 6, and 27.

APPENDIX IV

Summary of Sightings Reported to and Analysed by Department of Transport During 1952.

Following is a summary of the sightings investigated by the Department of Transport during 1952. A few other sightings were reported but were obviously of conventional objects and are omitted from this analysis. These summary reports are much abbreviated but contain the salient features. The names of the observers have been omitted since many of them were reluctant to have their names used and consented to give the information requested only on the distinct understanding that their names would not be quoted. The names, however, do appear on the sighting report forms or other official documents.

No evaluations of the individual sightings are included in these summaries, although in some cases the nature of the observed object is fairly obvious. In other cases the evaluations required much research and lengthy calculations, in trying to make them fit the various theories so far advanced. Most of these efforts were quite unsuccessful because the data lies outside conventional patterns.

The weighting factors shown have been worked out from the original data along the lines of Appendix II, and where more more than one observer was involved, the respective weighting

APPENDIX III

SAUCER SIGHTING ANALYSIS CHARTS

Chart I ..... General nature of sightings

Chart II ..... Origin of vehicles

Chart III .... Technology of vehicles

Chart IV ..... Nature of vehicles

Chart V ..... Optical and Radar considerations

Chart VI ..... Observations and physical laws

Chart VII .... Electrical and thermal phenomenae

Chart VIII ... Life forms

Chart IX ..... Astronomical bodies

Chart I

SAUCER SIGHTING ANALYSIS

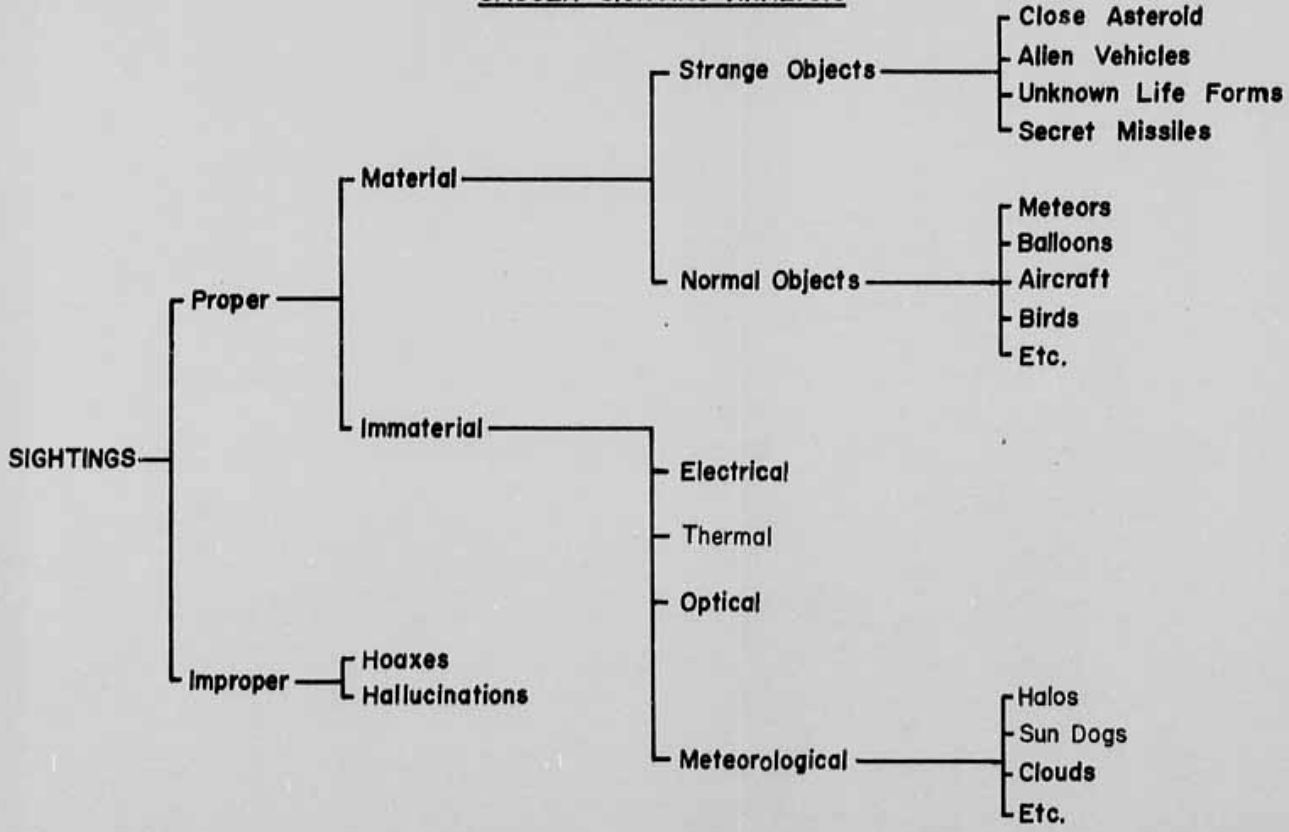


Chart II

SAUCER SIGHTING ANALYSIS

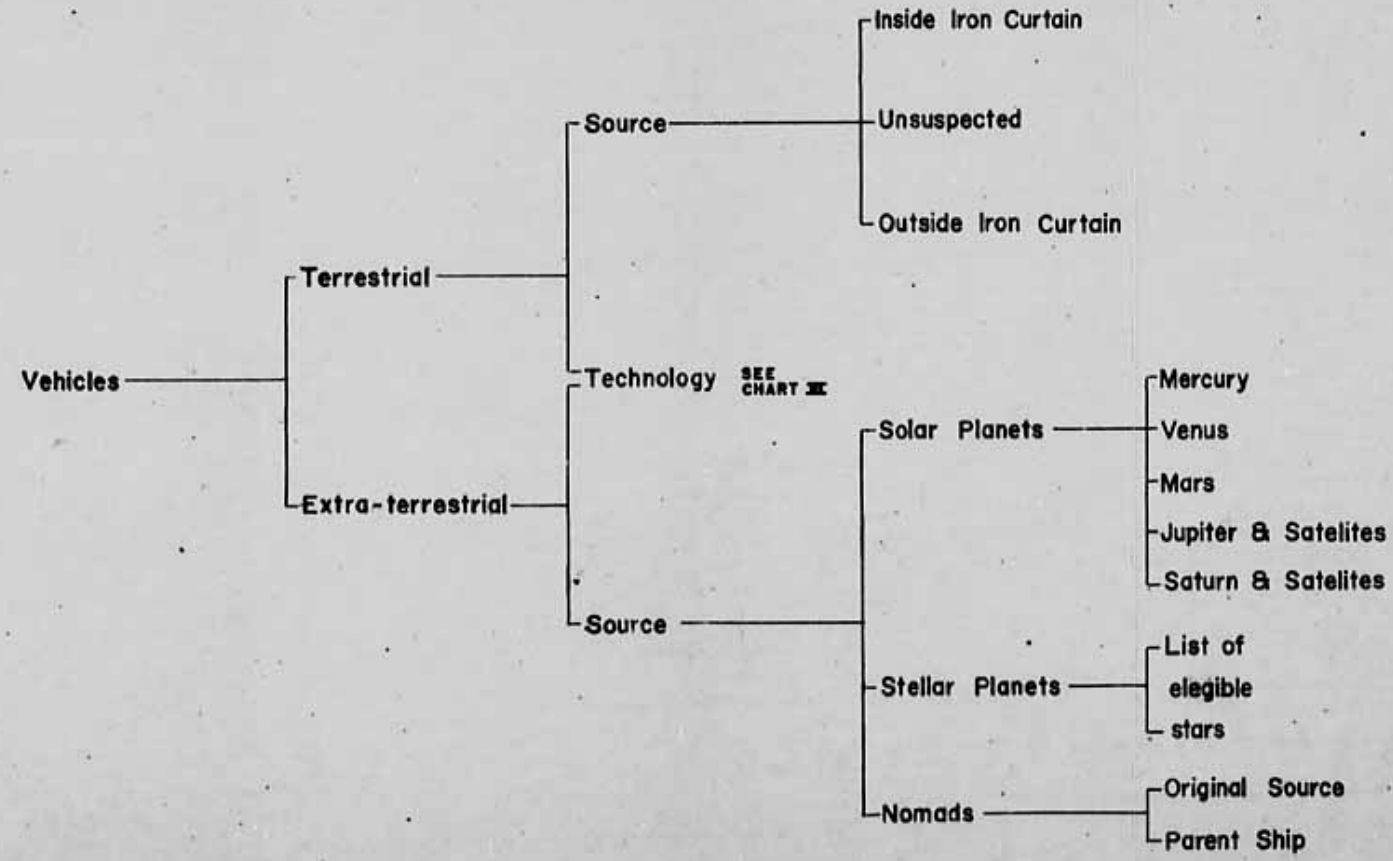


Chart IV

SAUCER SIGHTING ANALYSIS

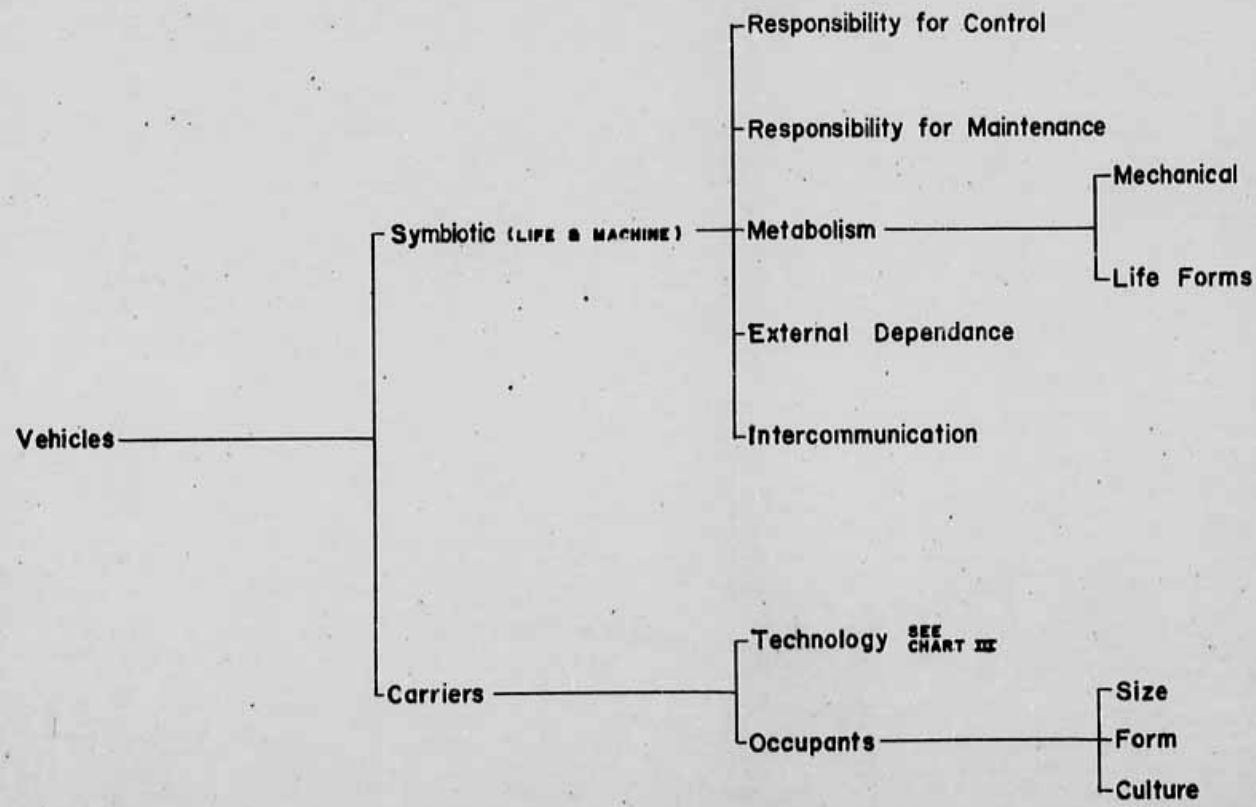


Chart III

SAUCER SIGHTING ANALYSIS

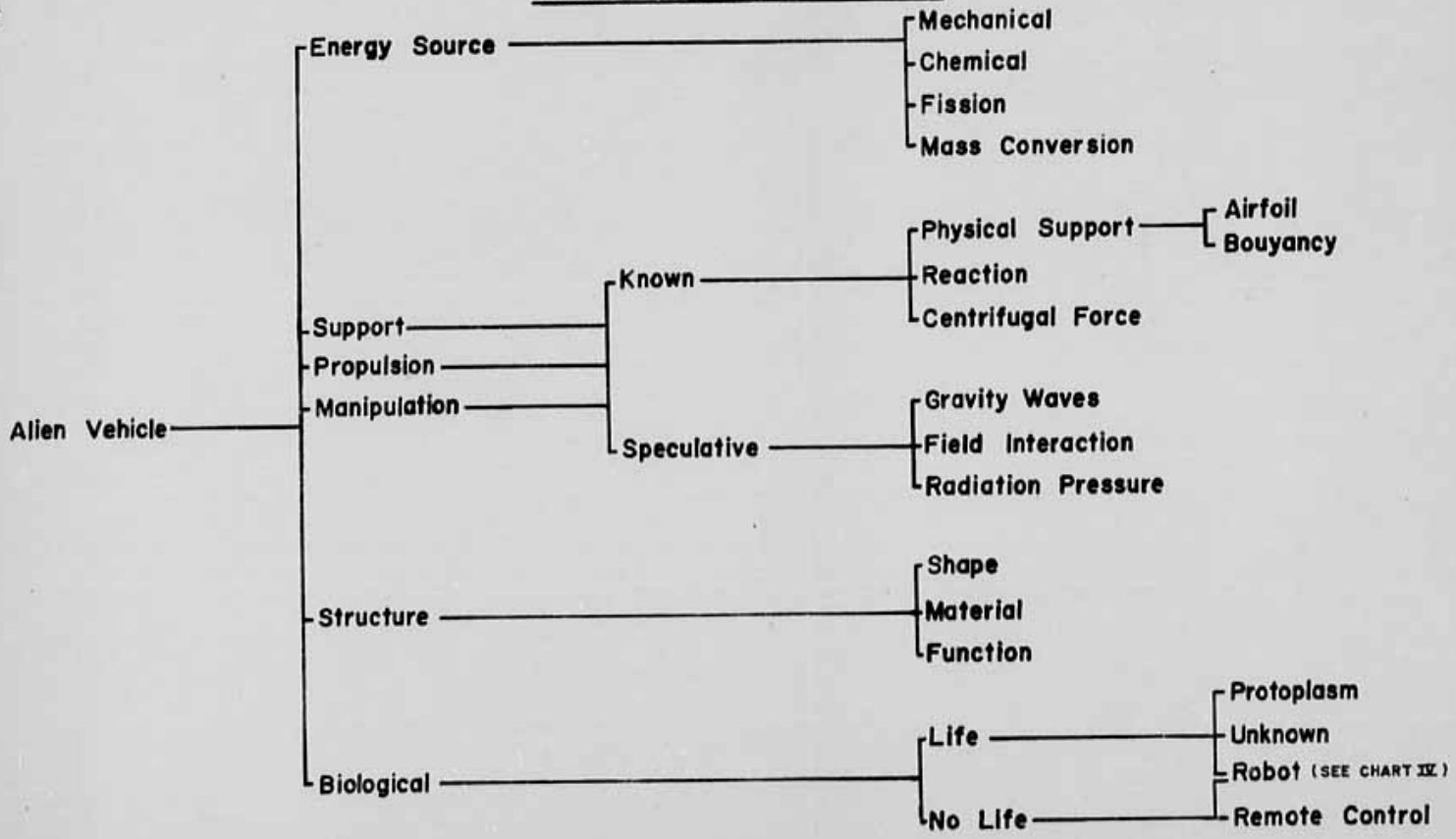


Chart V

SAUCER SIGHTING ANALYSIS

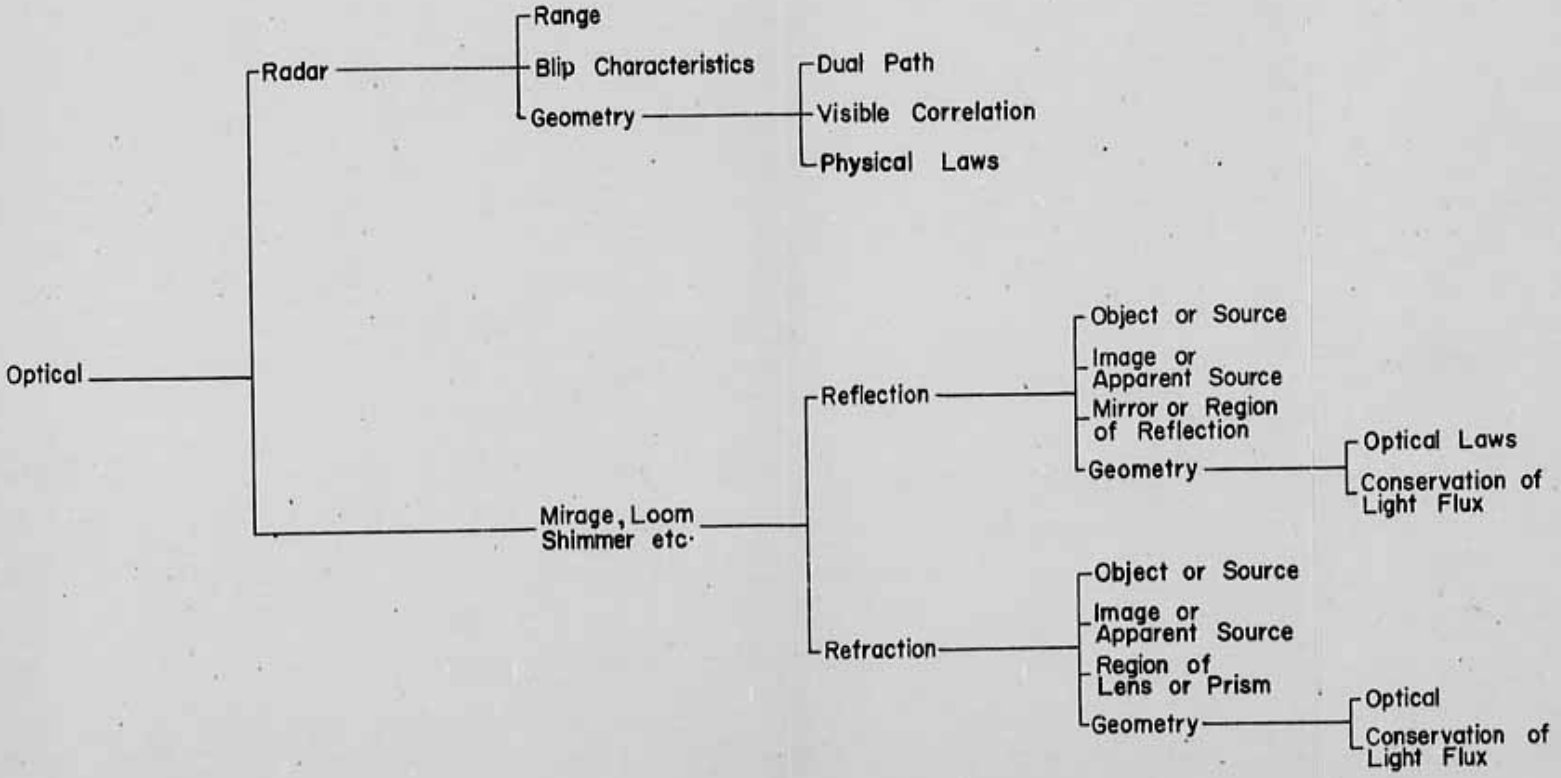


Chart VI

SAUCER SIGHTING ANALYSIS

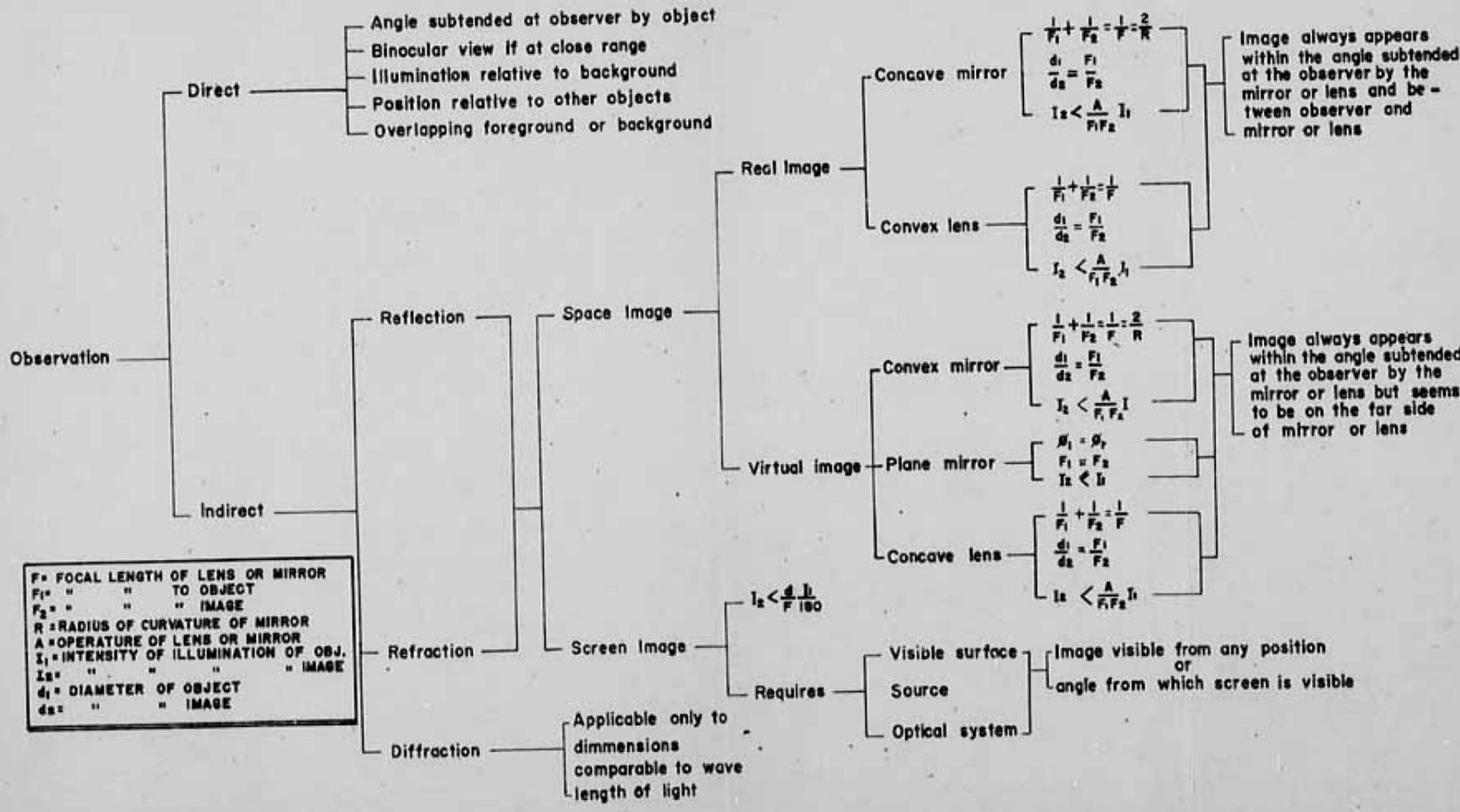


Chart VII

SAUCER SIGHTING ANALYSIS

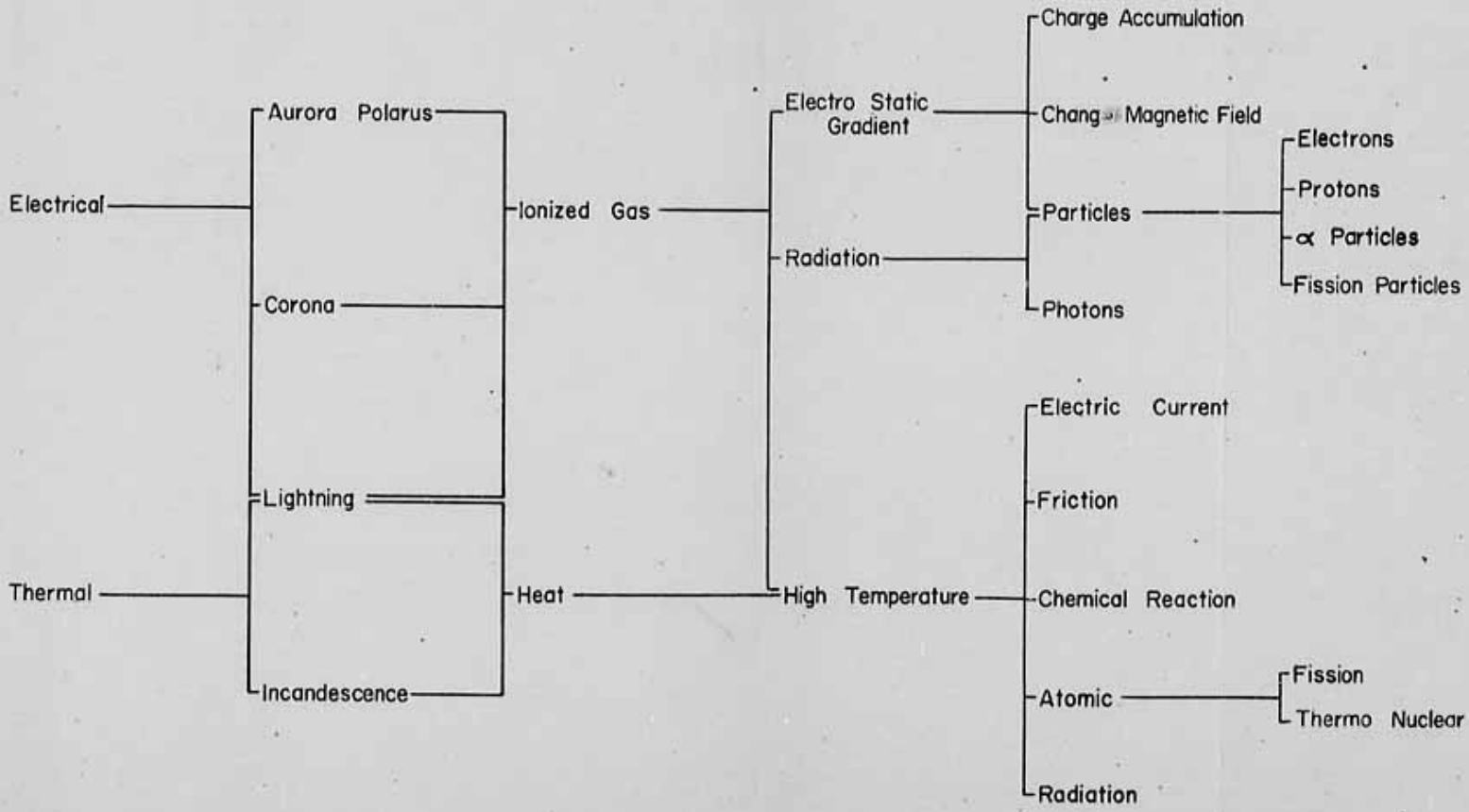


Chart VIII

SAUCER SIGHTING ANALYSIS

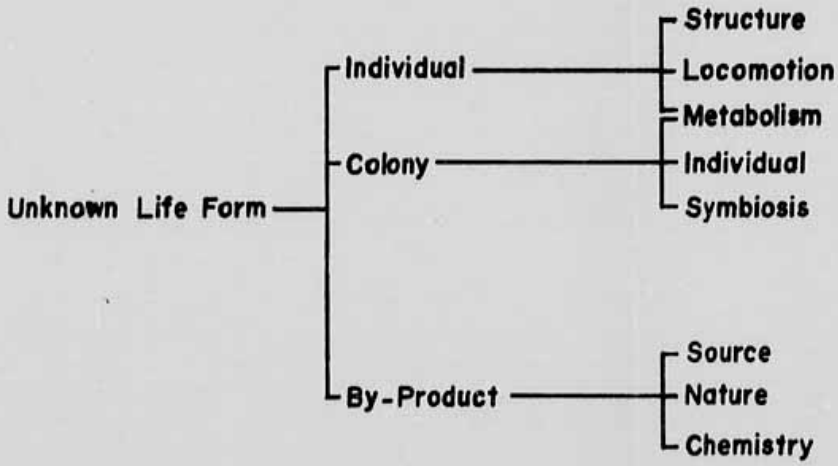
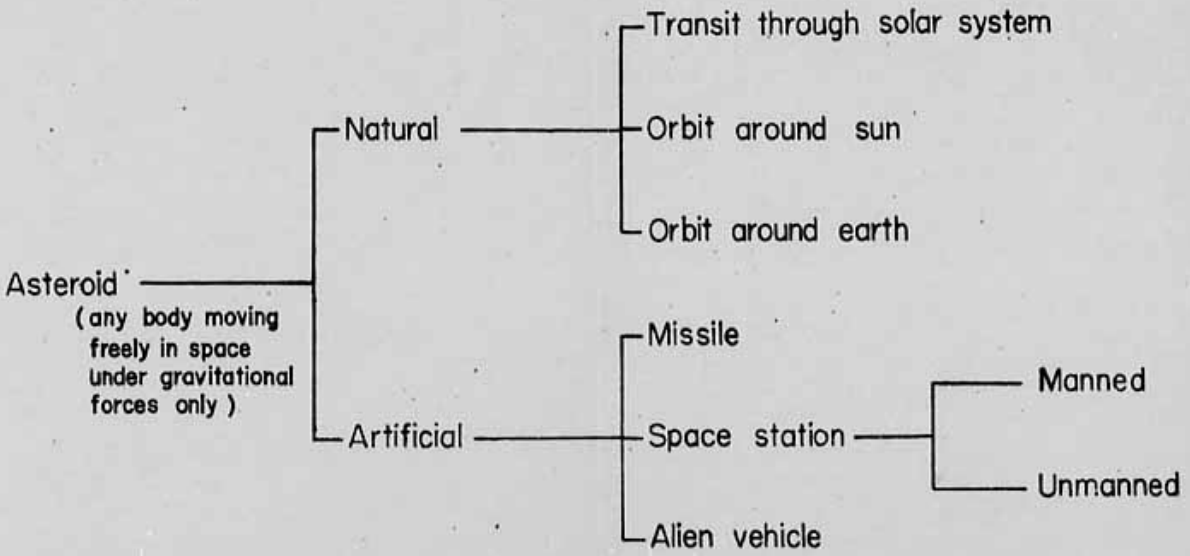


Chart IX

SAUCER SIGHTING ANALYSIS



factors were combined according to Peter's Forumla. These weighting factors are essentially the probability that the reports are reliable in themselves.

CASE 1, OTTAWA, MAY 1st, 1952, Weight 90%

At approximately 9.30 PM E.D.T. on May 1st a roundish, bright light streaked across Ottawa's southern horizon. It was seen by 6 people located in Ottawa and Aylmer who were interviewed immediately after the sighting. The light was visible about 12 seconds and went out abruptly at the end of its travel. Triangulations from data supplied by the observers fixed the termination of the path about over the Shirley Bay rifle range, with the start of the path somewhere near Uplands Airport. The altitude was computed at about 12,000 feet, and its speed at about 3,600 miles per hour. The path was estimated to be curved with the center of curvature near down town Ottawa. Triangulation computations estimated the diameter of the illuminated area as about 400 feet. The color of the light was predominately white, and it was very steady and the entire area appeared to be uniformly illuminated. The light suddenly went out at the end of its travel and nothing further was seen. There were no sounds reported.

Just preceding the above sighting two other observers noticed an orange ellipse in the south east sky from Ottawa, which appeared to hover for some time, after which it suddenly

vanished. The closest estimate of time in this case places the sighting as occupying a half hour between 8.45 and 9.15 E.D.T. The planet Mars was in the sky at the time but at a somewhat different bearing and elevation claimed for the object. No special note was taken of the planet.

At approximately 9.15 PM E.D.T. a light was seen by a single observer in Smiths Falls moving rapidly from east to west across the south west sky. The general description of this light was similar to that seen from the Ottawa area, except that it appeared to subtend a smaller angle.

CASE II, KARS, ONTARIO, MAY 24, 1952, Weight 61%

Within a few minutes of 9.26 PM, E.D.T. a farmer near Kars noticed a dull red round object moving from west to north in the sky. It was in view about a minute and then vanished beyond the horizon. It appeared to be about two thirds the diameter of the full moon, but not as bright as that body. No sounds were heard.

CASE III, HALIFAX, N.S., MAY 26, 1952, Weight 81%

At about 10.35 PM, A.S.T., a brilliant blue light streaked from south to northeast across the Halifax sky, leaving a trail behind it. This was seen by observers in Spryfield, Bass River and River John by four separate people. Triangulation fixes the path as starting a little to the east of Halifax and

terminating about over Tatamagouche. The duration of the sighting was about 2 seconds. The observer at River John claimed to have heard a hissing sound.

CASE IV, WENDOVER, ONTARIO, JUNE 6, 1952, Weight 64%

Five people in a car approaching Wendover at about 3.30 AM, E.D.T., noticed an orange red object moving from west north west to west, about 5° above the horizon, which was in view about a minute and then dropped below the horizon. The car was moving at the time.

CASE V, CALGARY, ALBERTA, JUNE 8, 1952, Weight 62%

A meteorological assistant was taking a Pibal observation at 11.47 AM, M.S.T., when a silvery ellipse, aspect ratio 8:1, crossed the field of vision of the theodolite. It was in view for 3 seconds. With reference to the height of the pibal balloon at the time the object was estimated to be higher than 50,000 feet. The object appeared to have a sharp outline and to shine from reflected sunlight.

CASE VI, HALIFAX, N.S., JUNE 15, 1952, Weight 75%

On June 15 at 8.32 AM, A.S.T., a meteorological assistant on reserve army manoeuvers noticed what seemed to be a large silver disc in the sky south east of Halifax. It moved southwest for about 30 seconds at an estimated altitude of 5,000 to 8,000 feet and then ascended vertically and in 2 to 5 seconds merged in altocumulus clouds at 11,000 to 12,000 feet. If the altitude estimates are correct, from the bearing and elevation data

obtained from this observer, the diameter of the disc works out at about 100 feet. A large standard aircraft was also in the sky at the time and the object seemed to move much more rapidly than the plane. The object's speed was estimated to be at least 800 miles per hour.

CASE VII, OTTAWA, ONTARIO, JUNE 20, 1952, Weight 86%

Five people saw a brilliant object travel rapidly from south to north across the eastern sky from Ottawa at 9.48 PM, E.D.T. The sighting lasted about 4 seconds, and consisted of a brilliant irregularly shaped head followed by a short luminous tail. Triangulation placed the path between 50 and 100 miles east of Ottawa, and from south to north.

CASE VIII, PECKSFORDS ISLAND, NFLD., JUNE 27, 1952, Weight 71%

Two lightkeepers at the Peckfords Island lighthouse noticed at 12.35 AM Nfld. time a reddish light slightly above the horizon travelling slowly from south to north east. Both lightkeepers ascertained that there was no boat or other object associated with the light.

CASE IX, VANCOUVER, B.C., JULY 3, 1952, Weight 39%

A single observer noticed at 11.55 PM, P.D.T., a bright round amber light move from the south in a northwesterly direction, until it was about due west when it turned and headed southwest. The object was in view about 1 minute.

CASE X, OTTAWA, ONTARIO, JULY 8, 1952, Weight 69%

A commissionaire on duty at an army depot saw a bright light about one quarter the size of the full moon, light orange in color, which travelled from the south towards the north, turned and travelled south again. It was in view about 1 minute. The time was about 10.15 PM, E.D.T.

CASE XI, BELLS CORNERS, ONTARIO, JULY 17, 1952, Weight 66%

On July 17 at about 10.50 PM, E.D.T., an observer in a car on Highway 15 near Bells Corners noticed a bright flash in the south east sky which consisted of a bright cream coloured object which travelled towards the south, broke into pieces and left a white trail which persisted for about 15 seconds.

CASE XII, HALIFAX, N.S., JULY 18, 1952, Weight 68%

At approximately midnight A.S.T. on July 18, an ex-airforce officer noticed a gold coloured bright ring about some central object which travelled rapidly from the north west towards the east and disappeared below the horizon. The angle subtended was about one quarter size of the full moon, and was visible about 8 or 9 seconds. There was no sound reported and no trails.

CASE XIII, OTTAWA, ONTARIO, JULY 20, 1952, Weight 74%

At approximately 11.42 AM, E.D.T. a tear drop shaped object was seen by a single observer for about 4 seconds as it flew into a cloud. The object was described as very shiny bright

and about one eighth size of the full moon. The course covered an arc of about 50° at an elevation of about 30° to 40°, and appeared to be curving towards its left.

CASE XIV, OTTAWA, ONTARIO, JULY 25, 1952, Weight 74%

At about 8.00 AM, E.D.T., seven bright objects were seen in V formation in the west and travelling south. They appeared bright, bluish and self luminous, round and about one half size of the moon. Again at about 11.45 AM, E.D.T., two more similar objects were seen north and travelling south east.

CASE XV, CARAQUET, N.B., JULY 30, 1952, Weight 53%

Between 6 and 7 PM, A.S.T., July 30, the lightkeeper at Caraquet observed a brilliantly shiny cone shaped object about 45° above the horizon, travelling from south to east.

CASE XVI, NOOTKA, B.C., JULY 30, 1952, Weight 68%

On July 30, 1952, at 1.37 AM, P.S.T. the lightkeeper at Nootka Station observed a luminous object travelling northwest by north. It was in view between 3 and 4 seconds and passed almost overhead. There was no sound or vapour trail.

CASE XVII, MACDONALD, MANITOBA, AUGUST 27, 1952, Weight 73%

A disc shaped object with shadows on it as if it had an irregular surface was seen by two meteorological officers at 4.45 AM, C.S.T. at MacDonald Airport. It was well below the altocumulus clouds at 5,000 feet, and subtended an angle of about 3° and was

about 30° above the horizon, and apparently right over the airport. The object made two turns about the field and when struck by the light from the rotating beacon made off toward the northeast and was out of sight within a second. There was no sound whatsoever. The object glinted like shiny aluminum when the beacon light struck it.

CASE XVIII, ALERT, N.W.T., NOVEMBER 25, 1952, Weight 55%

A meteorological observer at Alert, N.W.T., observed a lighted area in the sky which persisted for about 2 seconds, at 8.32 AM, G.M.T. The sky was overcast with a ceiling of about 2,000 feet. Lightning is practically unknown at these latitudes and there are no beacons within several hundred miles of Alert.

CASE XIX, REGINA, SASK., DECEMBER 1, 1952, Weight 68%

A number of school children on their way home observed two bright star-like objects overhead with cloudlike tails travelling from north to south at 11.45 AM, M.S.T. The motion was slow and regular with the two objects alternating in the lead. A meteorologist employed by the Department of Transport, interviewed one of the children by telephone and was able to estimate the height of the objects as the same as the cirrus clouds present at the time. The meteorologist checked with the airport control tower and found that a single conventional aircraft was the only one in the vicinity.

CASE XX, PRINCE RUPERT, B.C., DECEMBER 3, 1952, Weight 68%

The Chief Officer of a Canadian Goverment Steamship at berth in Prince Rupert at 8.00 AM, P.S.T., on December 3 observed a small bright object travelling east from a position north of the observer. It was about the same brightness as a major planet and subtended about the same angle as Jupiter at its nearest approach to the Earth. It was in view about 6 seconds. There was no sound and no trail.

CASE XXI, OTTAWA, ONTARIO, DECEMBER 16, 1952, Weight 68%

A bright disc shaped object subtending an angle of about 4' was observed at 5.14 PM, E.S.T., travelling very fast from north to south west. It was in view for 3½ seconds. The outline was sharp, and the major axis of the projected ellipse was always parallel to the horizon. The colour was similar to the planet Venus, but became slightly more reddish as it approached the horizon. There was no noise and no trail.

CASE XXII, WHITE RIVER, ONTARIO, DECEMBER 17, 1952

A railway yard employee observed a bright green flash in the south south west direction at 4.45 AM, E.S.T. There was no trail or sound.

CASE XXIII, REGINA, SASK., DECEMBER 27, 1952, Weight 74%

From 7.34 PM, M.S.T., to 7.42 PM, M.S.T., the airport control tower officer watched a round luminous object sustending an angle about one third that of the full moon, travel downwards and disappear beyond the horizon. I t travelled a vertical angle of 5°

in 1½ minutes. Object was viewed through 7x50 field glasses and a red flashing light on top and a green flashing light on the bottom were observed. Through the glasses the object appeared about the size of the full moon. There was no sound or trail.

CASE XXIV, REGINA, SASK., DECEMBER 31, 1952, Weight 78%

The Meteorological officer and Air Traffic controller at the Regina Airport observed a luminous circular object subtending about 8', travelling downwards to disappear beyond the horizon at 3.10 AM, M.S.T. It travelled the first 5 degress of its downward arc in 4 minutes and the last 5 degrees in three minutes. There was no additional detail visible through the field glasses.

CASE XXV, REGINA, SASK., DECEMBER 31, 1952, Weight 76%

Approximately 20 minutes after CASE XXIV at 3.30 AM, M.S.T., the same observers saw another somewhat similar object descending towards the horizon covering an arc of about 15 degrees in 3 or 4 minutes. This object seemed to fluctuate in brilliancy with about a 5 second period, appearing larger when brighter. The colour of the objects seen in CASES XXIII, XXIV, AND XXV was similar to that of a harvest moon, and about the same intensity. The objects definitely were not associated with the only aircraft aloft at the times of the sightings.